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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WEST, JEFFREY R	

ART UNIT	PAPER NUMBER
2857	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,743	MORRELL ET AL.	
	Examiner	Art Unit	
	JEFFREY R. WEST	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-14 and 16-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-14 and 16-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 April 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 12-14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,255,789 to Hartford et al. in view of U.S. Patent No. 4,727,549 to Tulpule et al. and further in view of U.S. Patent No. 4,916,698 to McCann.

With respect to claim 12, Hartford discloses a safety device for a sensor (column 13, lines 5-6), comprising a sensor element (column 13, lines 57-61) and circuits including a function section (column 13, lines 61-67), a checking section (i.e. A/D

converter, binary encoder, and microprocessor) (column 15, lines 4-17, column 15, lines 18-31, column 161, lines 34-41, and Figure 2) and a monitoring section (i.e. (Figure 5A), the function section including functional components supporting the function of the sensor element and producing a sensor output signal (column 13, lines 61-67), the checking section including checking components designed for the continuous checking of the functional components (column 17, lines 36-52), and the monitoring section comprising monitoring components designed for monitoring the checking components at least once during one operating cycle (column 163, lines 24-40), the monitoring components comprising a clock detector component monitoring a clock of a microcomputer contained in the checking section (column 163, lines 41-59) and a watchdog circuit monitoring the microcomputer (column 163, line 60 to column 164, line 6).

With respect to claim 13, Hartford discloses that the checking components measure values in the function section and compare the measured values with limit values (column 17, lines 36-52).

With respect to claim 14, Hartford discloses that the checking components measure the sensor output signal and compare the measured sensor output signal with limit values (column 17, lines 36-52).

With respect to claim 18, Hartford discloses that the monitoring components are designed essentially to monitor digital checking components (i.e. the microprocessor of the checking components) (column 163, line 60 to column 164, line 6).

As noted above, the invention of Hartford teaches many of the features of the claimed invention and while the invention of Hartford does teach a watchdog circuit as part of a monitoring section for monitoring the microcomputer of the checking section, Hartford does not specifically disclose a memory testing device for testing memories within the checking section.

Tulpule teaches a watchdog activity monitor for use with a high coverage processor self-test comprising a microprocessor (column 6, lines 35-44) which is tested (column 6, lines 45-51) using an independent (column 2, lines 15-23) watchdog circuit (column 7, lines 3-14) that tests the memories of the microprocessor (column 7, lines 24-40).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hartford to specifically disclose means for testing memories within the checking section, as taught by Tulpule, because, as suggested by Tulpule, the combination would have improved the monitoring of Hartford by confirming that the microprocessor address decoding is accurate thereby confirming overall operation of the microprocessor of Hartford and insuring accurate sensor functionality (column 7, lines 36-53).

As noted above, the invention of Hartford and Tulpule teaches many of the features of the claimed invention and while the invention of Hartford and Tulpule does teach interface/conditioning circuitry as part of the functional components of the function section and checking components, including a microprocessor, designed for continuous checking of the functional components, the combination

does not specify that the checking components comprise a test injector producing and supplying test signals to the functional components, the checking components testing the functional components and measuring a reaction of the functional components to the test signals.

McCann teaches a failure detection mechanism for microcontroller based control system comprising a speed sensor and signal conditioning circuitry acting as part of functional components (column 2, lines 25-31 and 38-41) and a microprocessor acting as part of a checking section that comprises a test injector producing and supplying test signals to the functional components, the checking components testing the functional components and measuring a reaction of the functional components to the test signals (column 3, lines 5-13).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hartford and Tulpule to specify that the checking components comprise a test injector producing and supplying test signals to the functional components, the checking components testing the functional components and measuring a reaction of the functional components to the test signals, as taught by McCann, because, as suggested by McCann, the combination would have improved sensing system of Hartford and Tulpule by insuring that the various input/output ports of the sensor and interface/conditioning circuitry of Hartford and Tulpule are appropriately responding to the microprocessor (column 3, lines 5-13).

4. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Hartford et al. in view of Tulpule et al. and McCann and further in view of U.S. Patent No. 5,406,485 to Wise et al.

As noted above, Hartford in combination with Tulpule and McCann teaches many of the features of the claimed invention and while the invention of Hartford, Tulpule, and McCann does teach obtaining data from functional components that are part of a function section of a sensor as well as a checking section for accessing the output of the functional components, the combination does not explicitly indicate that the function section comprises digital components and analog components, the checking components including checking analog components and at least one ADC for accessing registers of the digital components and measuring analog signals at the analog components.

Wise teaches a method and apparatus for detecting faulty operation of a wheel speed sensor comprising a sensor (column 3, lines 11-13) and associated interface and functional components (i.e. function section) (column 3, lines 11-20) wherein the function section comprises digital components (column 3, lines 51-54) and analog components (column 4, lines 39-57), and checking components include checking analog components for measuring analog signals at the analog components (column 3, lines 42-46) and at least one ADC for accessing registers of the digital components (column 3, lines 51-60).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hartford, Tulpule, and McCann to explicitly indicate that the function section comprises digital components and analog components, the checking

components including checking analog components and at least one ADC for accessing registers of the digital components and measuring analog signals at the analog components, as taught by Wise, because the invention of Hartford, Tulpule, and McCann discloses a system for monitoring the output of a plurality of vehicle sensors (Hartford, Figure 2) and Wise suggests an applicable vehicle sensor and associated monitoring method that would have provided corresponding means for insuring the accuracy of the sensors while providing increased functionality of Hartford, Tulpule, and McCann by including advanced conditioning aspects and the ability to store the data for speed computations (column 2, lines 33-46 and column 3, lines 42-46 and 51-60).

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hartford et al. in view of Tulpule et al. and McCann and further in view of U.S. Patent No. 6,568,267 to Chida et al.

As noted above, Hartford in combination with Tulpule and McCann teaches many of the features of the claimed invention and while the invention of Hartford, Tulpule, and McCann does teach a function section, checking section, and monitoring section, the combination does not specifically indicate that the sections are formed by an ASIC with dedication sections.

Chida teaches a sensing devices and sensor apparatus wherein the sensor is formed from an ASIC, inherently comprising gates, having a main central processing

section and separate dedicated sections for performing different specific computations, functions, and other processes (column 20, lines 57-65).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hartford, Tulpule, and McCann to specifically indicate that the sections are formed by an ASIC with dedication sections, as taught by Chida, because Chida suggests that, and as is known by one having ordinary skill in the art, ASICs with dedicated functionality are a common device for providing different dedicated functional sections as would be desirable in the sensor system of Hartford, Tulpule, and McCann (column 20, lines 57-65).

6. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hartford et al. in view of Tulpule et al. and McCann and further in view of U.S. Patent No. 6,366,005 to Ishikawa et al.

As noted above, Hartford in combination with Tulpule and McCann teaches many of the features of the claimed invention and while the invention of Hartford, Tulpule, and McCann does teach a safety device for a plurality of vehicle sensors (Hartford; Figure 2), the combination does not explicitly include a rotation rate sensor.

Ishikawa teaches a tuning fork type vibration gyro acting as a rotation rate sensor generating an analog output signal to an analog-to-digital converter (column 11, lines 35-60).

It would have been obvious to one having ordinary skill in the art to modify the invention of Hartford, Tulpule, and McCann to explicitly include a rotation rate

sensor, as taught by Ishikawa, because the invention of Hartford, Tulpule, and McCann does describe a system for use with a plurality of vehicle sensors and the combination would have improved the applicability of the system of Hartford, Tulpule, and McCann by employing the system to a wider variety of sensors by including a rotation rate sensor, specifically with a construction that is capable of preventing destruction of a tuning fork vibrator with improved accuracy through unnecessary signal compensation (column 1, lines 8-11 and column 3, lines 13-21).

Response to Arguments

7. Applicant's arguments filed December 07, 2007, have been fully considered but they are not persuasive.

After careful consideration of Applicant's arguments, the Examiner maintains that the limitation of "the checking components comprising a test injector producing and supplying test signals to the functional components, the checking components testing the functional components and measuring a reaction of the functional components to the test signals" is taught by the invention of McCann for the following reasons:

While Applicant presents several interpretations of McCann, the Examiner considers that the argument that best presents the point of contention is as follows:

> ... The microcontroller of McCann only "initiates the self-check circuits of the signal conditioning circuitry 20 upon system power-up by generating a control signal through output line 22, which connects the microcontroller with the conditioning circuits 20. McCann thus teaches that a signal is supplied to the signal conditioning circuit by the microcontroller. However, the micro-controller of

McCann does not determine the correct operation of the signal condition circuit or the sensor and does not inject test signals.

Accordingly, McAnn fails to teach or suggest that the microprocessor in a checking circuit of McCann includes "a test injector producing and supplying test signals to the functional components, the checking components testing the functional components and measuring a reaction of the functional components to the test signals...", as now recited in independent claim 12. Rather, the production and supply of test signals is performed by the self-test circuitry within the signaling conditioning circuits 20, which are part of the functional circuit.

First, the Examiner asserts that McCann teaches a speed sensor and signal conditioning circuitry acting as part of functional components:

> The adaptive braking system 10 includes an electronic control unit generally indicated by the numeral 12 which **receives input signals from wheel speed senors 14** (only two of which are being shown, but any number may be used) and transmits control signals which actuates solenoids (not shown) on control valve 16.
>
> ...
>
> Electronic control unit 12 **further includes signal conditioning circuitry 20 which receives signals from the speed sensors 14** and transmits them to the microcontroller 18. (column 2, lines 25-31 and 38-41 – emphasis added)

And a microprocessor acting as part of a checking section:

> The various input/output ports are checked as part of the sensor and signal conditioning 20 and drive circuit 28 tests. **Stimuli for these tests are transmitted from the microcontroller** and the appropriate responses are returned as described above. Assuming that everything is operating properly, the microcontroller program is arranged to toggle a watchdog output line generally indicated by the numeral 32 at a predetermined rate. (column 3, lines 5-13 – emphasis added)

The Examiner also asserts that the limitation in question only requires the checking components comprising a test injector "producing and supplying test signals to the functional components" and "the checking components testing the functional components and measuring a reaction of the functional components to the

test signals". The limitation for "producing and supplying test signals to the functional components" does not specify what constitutes test signals. The Examiner asserts that McCann explicitly produces and supplies stimuli signals to the sensor and signal conditioning for testing and therefore meets the limitation for "producing and supplying test signals to the functional components", specifically:

> **The various input/output ports are checked as part of the sensor and signal conditioning 20 and drive circuit 28 tests. Stimuli for these tests are transmitted from the microcontroller** and the appropriate responses are returned as described above. Assuming that everything is operating properly, the microcontroller program is arranged to toggle a watchdog output line generally indicated by the numeral 32 at a predetermined rate. (column 3, lines 5-13 - emphasis added)

Next, while the Examiner agrees with Applicant that the invention of McCann includes self-check circuits of signal conditioning circuitry, the Examiner, however, asserts that the microprocessor does more than just initiate the self-check circuits, but also performs testing of the functional components by initiating the testing through the generation of stimuli as well as measures a reaction of the function components to the test signals, specifically by looking for appropriate responses caused by the production and supplying of the stimuli:

> The microcontroller initiates the self-check circuits of the signal conditioning circuitry 20 upon system power-up by generating a control signal through output line 22, which connects the microcontroller with the conditioning circuits 20. **The microcontroller 18 actuates the self-check circuits and looks for appropriate responses back through the normal signal paths indicated by lines 24 on FIG. 1**. (column 2, lines 45-52 - emphasis added)
>
> The various input/output ports are checked as part of the sensor and signal conditioning 20 and drive circuit 28 tests. **Stimuli for these tests are**

> **transmitted from the microcontroller** and the appropriate responses are returned as described above. Assuming that everything is operating properly, the microcontroller program is arranged to toggle a watchdog output line generally indicated by the numeral 32 at a predetermined rate. (column 3, lines 5-13 - emphasis added)

For these reasons, the Examiner maintains that the invention of McCann teaches "the checking components comprising a test injector producing and supplying test signals to the functional components, the checking components testing the functional components and measuring a reaction of the functional components to the test signals".

The Examiner also maintains that it would have been obvious to one having ordinary skill in the art to modify the invention of Hartford and Tulpule to specify that the checking components comprise a test injector producing and supplying test signals to the functional components, the checking components testing the functional components and measuring a reaction of the functional components to the test signals, as taught by McCann, because, as suggested by McCann, the combination would have improved sensing system of Hartford and Tulpule by insuring that the various input/output ports of the sensor and interface/conditioning circuitry of Hartford and Tulpule are appropriately responding to the microprocessor (column 3, lines 5-13).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

JP Patent Application Publication No. 63-016150 to Kinugawa teaches an engine control device with a CPU monitoring watchdog circuit.

U.S. Patent No. 6,445,176 to Wallrafen teaches a self-adaptive sensor unit for determining pulse switching points.

U.S. Patent No. 4,783,659 to Frick teaches an analog transducer circuit with digital control.

U.S. Patent Application Publication No. 2003/0187569 to Iwagami et al. teaches a vehicle-mounted electronic control apparatus.

U.S. Patent No. 6,188,340 to Matsumoto et al. teaches a sensor adjusting circuit.

U.S. Patent No. 6,339,373 to Zeskind et al. teaches a sensor device providing indication of device health.

U.S. Patent No. 6,014,100 to Fehrenbach et al. teaches a two-wire radar sensor with intermittently operating circuit components.

U.S. Patent No. 6,510,397 to Choe teaches a method and apparatus for self-diagnosis of a sensor.

Webster's Online Dictionary, "Register", teaches the well-known definition of a register as a "memory device that is part of computer memory that has a specific address and that is used to hold information of a specific kind."

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY R. WEST whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eliseo Ramos-Feliciano can be reached on (571)272-7925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey R. West/
Primary Examiner, Art Unit 2857

March 13, 2008